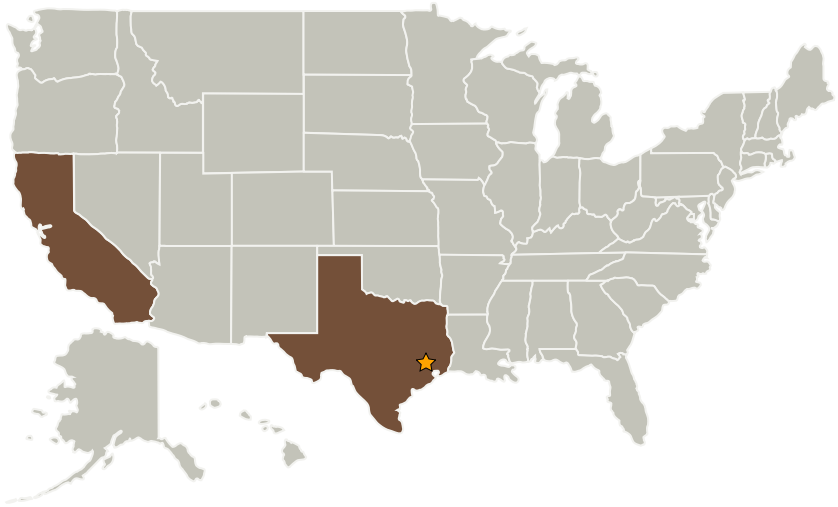
Transpiration Cooled Thrust Chamber Technology, Phase II

Completed Technology Project (2007 - 2009)

Project Introduction

NASA has determined that it requires extremely durable, high-performance, low cost engines to meet future multi-use in-space, non-toxic, cryogenic propulsion requirements such as orbit transfer, descent, ascent and pulsing attitude control. Transpiration-cooling technology has long been considered a candidate for long-life thrust chambers but has never been deployed on a domestic rocket engine. In this program WASK Engineering, Inc. proposes to design, fabricate and hot-fire test a 100 lbf reaction control engine (RCEs) with transpiration-cooled thrust chambers and novel injector design. This effort will build on the technology demonstrations achieved on our Phase I program. These new transpiration-cooled O2/CH4 RCEs will be tested in existing atmospheric (non-vacuum) test facilities on an existing and operational test stand. Test results will be used to anchor and refine existing transpiration cooling thermal/performance analysis models. Ultimately, results of this Phase II program will lead to a durable, low cost, non-toxic RCE technology capable of using in situ propellant combinations, particularly oxygen/methane that will have higher performance than current toxic, expensive, storable hypergolic RCE designs using rhenium-based thrust chamber technology.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
WASK Engineering, Inc.	Supporting Organization	Industry Small Disadvantaged Business (SDB)	Cameron Park, California

Primary U.S. Work Locations	
California	Texas

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX01 Propulsion Systems
  - TX01.1 Chemical Space Propulsion
    - TX01.1.3 Cryogenic